Occupational contact dermatitis caused by (3-mercaptopropyl)trimethoxysilane in a windscreen repairer

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Windscreen repairers and glaziers may be exposed to various allergens that are present in glues, sealants, and windscreen repair products. Occupational contact dermatitis caused by methacrylates in windscreen repairers has been reported previously (1 – 3). We present a patient involved in windscreen replacement work with contact allergy to an organosilane present in an adhesion promoter solution.

**Case Report**

A 33-year-old glazier presented with fingertip eczema. He worked in a car repair shop in windscreen repair and replacement. When installing a new windscreen, he first treated the windscreen edges with a primer, and then treated them with adhesion promoter solution prior to the application of the windscreen adhesive. The adhesion
Patch tests were performed with a modified European baseline series, isocyanate, acrylate, epoxy and glues and plastics series, and the patient’s own substances from the workplace, including the adhesion promoter and the primer. Patch testing showed positive reactions to the adhesion promoter in a concentration as low as 0.032% (Table 1) on D4. The patient was patch test negative for the primer, and for the isocyanate series and 4,4’-diaminodiphenylmethane. In further patch testing, (3-mercaptopropyl)trimethoxysilane (Sigma-Aldrich Chemie GmbH, Steinheim, Germany) was positive down to a concentration of 0.0016%, that is, 16 ppm (Table 1), on D4. Subsequently, (3-mercaptopropyl)trimethoxysilane was patch tested as 1% pet. in 20 control patients, with negative results.

Our patient continued in his work. He avoided skin contact with the adhesion promoter by wearing disposable nitrile rubber gloves when applying it. He also avoided contact with the primer and adhesive. At a follow-up visit after 8 months, fingertip eczema had not recurred.

Discussion

(3-Mercaptopropyl)trimethoxysilane is an organosilane. These compounds may be used as coupling agents to enhance bonding between inorganic surfaces such as glass or metal and organic compounds, as sizing agents for glass fibres, and as coating for glass filaments (4). Cases with occupational contact allergy to organosilanes have been previously reported in glass filament manufacture, in which the reported allergens were (vinylbenzylaminoethyl)aminopropyltrimethoxysilane and 3-(2-aminoethyl aminopropyl)trimethoxysilane (5–7). To our knowledge, this is the first report of contact allergy to (3-mercaptopropyl)trimethoxysilane. This is probably a rare occupational allergy, the diagnosis of which requires patch testing with the patient’s own materials and the product ingredients.

Fig. 1. Chemical structure of (3-mercaptopropyl)trimethoxysilane (CAS no. 4420-74-0).

Table 1. Patch test results at D4 with the adhesion promoter and its ingredient (3-mercaptopropyl)trimethoxysilane.

<table>
<thead>
<tr>
<th>Reaction</th>
<th>Concentration (%) Reaction</th>
<th>Concentration (%) Reaction</th>
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<tbody>
<tr>
<td>+</td>
<td>0.1</td>
<td>+</td>
</tr>
<tr>
<td>++</td>
<td>0.16</td>
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<td>+</td>
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<tr>
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<td>0.005</td>
<td>?</td>
</tr>
<tr>
<td>?</td>
<td>0.0016</td>
<td>?</td>
</tr>
<tr>
<td>Negative</td>
<td>0.0016</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Pet. was used as the vehicle.

References

6 Heino T, Haapa K, Manelius F. Contact sensitization to organosilane solution in glass filament manufacture. Contact Dermatitis 1996: 34: 294.